Discovery of oxygen in atmosphere could mean life for Saturn’s moon Dione

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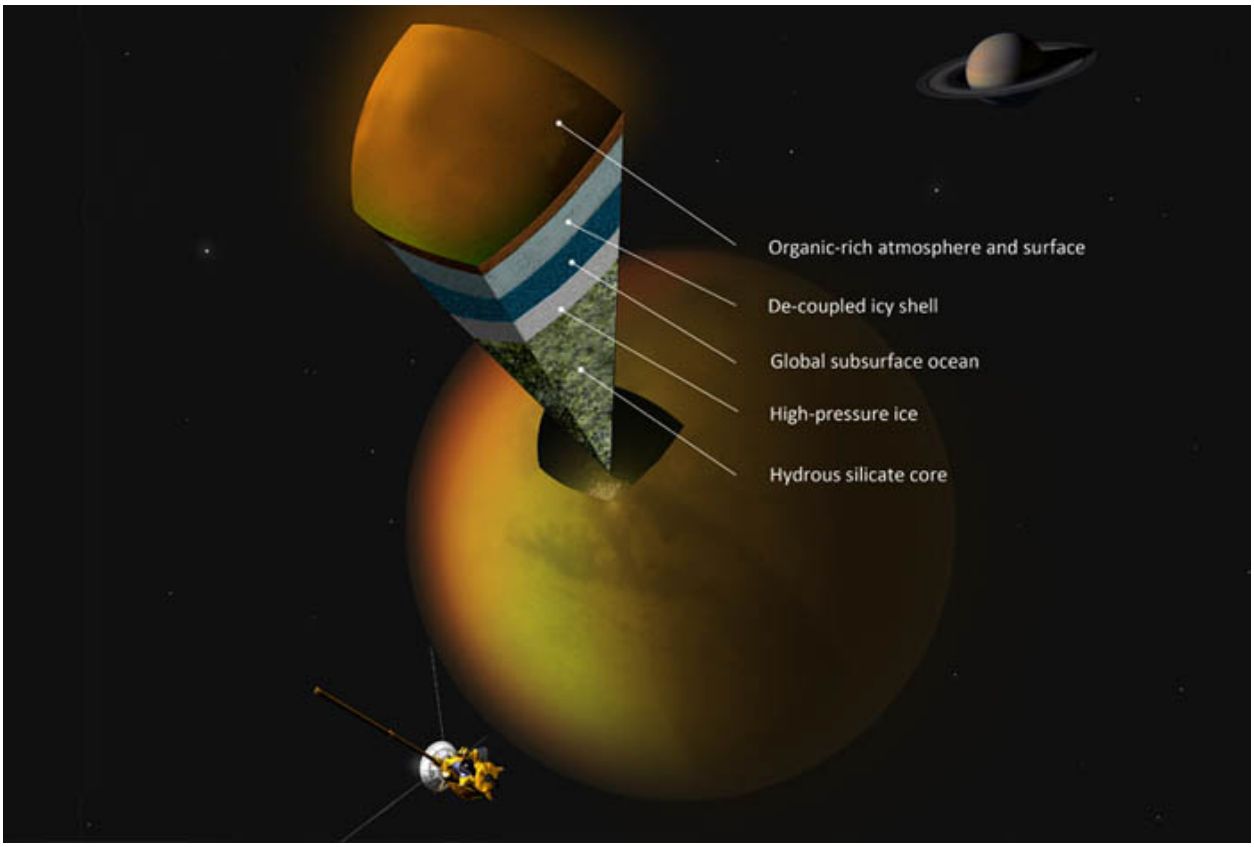

Oxygen detected in atmosphere of Saturn’s moon Dione

The discovery of molecular oxygen ions (O_2+) in the upper-most atmosphere of Dione, one of the 62 known moons orbiting Saturn, was announced by LANL scientists and an international research team.

The research appeared recently in Geophysical Research Letters and was made possible via instruments aboard NASA’s Cassini spacecraft, which was launched in 1997.

Combination of oxygen with carbon an exciting possibility

Perhaps even more exciting is the possibility that on a moon with subsurface water, such as Jupiter's moon Europa, molecular oxygen could combine with carbon in subsurface lakes to form the building blocks of life.

Charged particles slam into Dion surface, displacing oxygen ions

Dione is a mere 700 miles wide and appears to be a thick, pockmarked layer of water ice surrounding a smaller rock core. As it orbits Saturn every 2.7 days, Dione is bombarded by charged particles (ions) emanating from Saturn's very strong magnetosphere.

These ions slam into the surface of Dione, displacing molecular oxygen ions into Dione's thin atmosphere through a process called sputtering. Los Alamos researchers Robert Tokar and Michelle Thomsen of Space Science and Applications noted the presence of the oxygen ions.

"The concentration of oxygen in Dione's atmosphere is roughly similar to what you would find in Earth's atmosphere at an altitude of about 300 miles," Tokar said. "It's not enough to sustain life, but—together with similar observations of other moons around Saturn and Jupiter—these are definitive examples of a process by which a lot of oxygen can be produced in icy celestial bodies that are bombarded by charged particles or photons from the Sun or whatever light source happens to be nearby."